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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/875,597	06/06/2001	Fanping Sun	67,007-001	7188

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CARLSON, GASKEY & OLDS, P.C.  
400 WEST MAPLE ROAD  
SUITE 350  
BIRMINGHAM, MI 48009

EXAMINER

TERESINSKI, JOHN

ART UNIT	PAPER NUMBER
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2858

DATE MAILED: 08/04/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/875,597

Applicant(s)

SUN ET AL.

Examiner

John Teresinski

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on amendment filed 13 May 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-26 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-26 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.  
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).  
\* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).  
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) 4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) 5) ☐ Notice of Informal Patent Application (PTO-152)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_ 6) ☐ Other: \_\_\_\_\_

***Claim Rejections - 35 USC § 103***

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1, 7, 8, 12, 16, 19, 20, 21, 23, 25 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over of U.S. Patent No. 5,195,046 to Gerardi et al. in view of U.S. Patent No. 5,349,857 to Kasanami et al..

Regarding claims 1, 2, 8, 12, 16, 21, 23, 25 and 26, Gerardi et al. disclose a method of determining a structural condition and a piezoelectric sensor that is adapted to be supported on an item (column 3 lines 9-11) and changes of the impedance as indication of structural deformation/faults (column 5 lines 65-68), a signal conditioner that conditions a signal including an indication of a voltage drop across the sensor (column 4 lines 1-9), a transmitter that transmits the processed signal, a remotely located interface that receives the signal and provides an output indicative of the impedance of the processed signal and structural condition of the item (column 7 lines 38-48). Gerardi et al. does not disclose a resistive element coupled in series with, and independent of the piezoelectric sensor. Kasanami et al. discloses a vibratory sensor including a piezoelectric sensor (column 5 lines 43-54 Fig. 3 element 16b) having a separate resistive element with no inductance coupled in series with the piezoelectric sensor (column 9 lines 40-54, Fig. 13 element 102) and with output taken between the sensor and resistive element (Fig. 13 see element 102a). It would have been obvious to one of ordinary skill in the art at the time the

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invention was made to include the separate resistive element as taught by Kasanami et al. into Gerardi et al. reference for the added benefit of providing a means for correcting phase errors (column 9 lines 40-54).

Regarding claim 7, Gerardi et al. discloses determining the mechanical impedance value of the processed signal and determines structural condition (column 3 lines 30-44).

Regarding claim 19, Gerardi et al. discloses conditioning the signal to remove selected frequency components/filtering prior to transmitting the signal (column 13 lines 20-29).

Regarding claim 20, Gerardi et al. discloses a frequency dependant voltage drop (column 12 lines 34-40).

Claims 3 and 4 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerardi et al. and Yamashita as applied to claim 1 above, and further in view of U.S. Patent No. 3,924,456 to Vahaviolos.

Regarding claim 3, Gerardi et al. discloses the use of a filter (column 8 lines 29-33). Gerardi et al. as modified does not disclose the use of a bandpass filter. Vahaviolos discloses the use of a bandpass filter (column 9 lines 5-35). It would be obvious to one of ordinary skill in the art to include a bandpass filter as taught by the Vahaviolos reference into Gerardi et al. and Yamashita for the purpose of removing noise from a signal.

Regarding claim 4, Gerardi et al. as modified does not disclose removing signal components below 50 KHz and approximately above 200 KHz. Vahaviolos discloses the removing signal components below 50 KHz and above 200 KHz (column 11 lines 49-52). It

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would be obvious to one of ordinary skill in the art to include the removal of the specified frequency ranges as taught by Vahaviolos into Gerardi et al. and Kasanami et al. for the purpose of eliminating noise and selecting a frequency range suited for the material being tested.

Claims 5, 6, 9, 13-15, 22 and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerardi et al. and Kasanami et al. as applied to claims 1, 8 and 12 above, and further in view of U.S. Patent No. 6,370,964 to Chang et al..

Regarding claims 5, 6, 14, 15, 22 and 24, Gerardi et al. as modified does not disclose wireless communication or the utilization of radio frequency communication. Chang et al. disclose wireless signal transmission and the utilization of radio frequency signal communication (column 7 lines 60-64). It would be obvious to one of ordinary skill in the art to include wireless communication means and radio frequency communication as taught by Chang et al. into Gerardi et al. as modified for the purpose of eliminating transmission cables.

Regarding claim 9, Gerardi et al. as modified does not disclose a sine sweep generator. Chang et al. disclose a sine sweep generator (column 9 lines 64-67, column 10 lines 1-5). It would be obvious to one of ordinary skill in the art to include a sine sweep generator as taught by Chang et al. into Gerardi et al. as modified for the purpose actuating the piezoelectric sensor.

Regarding claim 13, Gerardi et al. disclose using the sensor as an actuator (column 16 lines 65-68), but does not disclose embedding the sensor within a portion of the item. Chang et al. disclose embedding the sensor within a portion of the item (column 3 lines 41-44).

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Claims 10, 11 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Gerardi et al. and Kasanami et al. as applied to claims 1, 8 and 12 above, and further in view of U.S. Patent No. 3,926,039 to Zhukov et al..

Regarding claims 10, 11 and 17, Gerardi et al. as modified does not disclose differentiating an impedance value of the transmitted signal using an RC circuit. Zhukov et al. disclose synchronizing pulses received by a receiver via a differentiating RC circuit (column 3 lines 31-40). It would be obvious to one of ordinary skill in the art to include synchronization using an RC circuit as taught by Zhukov et al. into Gerardi et al. as modified for the purpose of detecting flaws or defects.

Claim 18 is rejected under 35 U.S.C. 103(a) as being unpatentable over Gerardi et al., Kasanami et al. and Zhukov et al. as applied to claims 12 and 17 above, and further in view of U.S. Patent No. 6,370,964 to Chang et al..

Regarding claim 18, Gerardi et al. as modified do not disclose the use of a sine sweep generator. Chang et al. disclose a sine sweep generator (column 9 lines 64-67, column 10 lines 1-5). It would be obvious to one of ordinary skill in the art to include a sine sweep generator as taught by Chang et al. into Gerardi et al. as modified for the purpose actuating the piezoelectric sensor.

### ***Response to Arguments***

Applicant's arguments with respect to claims 1-24 have been considered but are moot in view of the new ground(s) of rejection.

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***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to John Teresinski whose telephone number is (703) 305-4746.

The examiner can normally be reached on M-F 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, N. Le can be reached on (703) 308-0750. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 872 9319 for regular communications and (703) 872 9318 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.

JT  
JT

July 25, 2003



**N. Le**  
**Supervisory Patent Examiner**  
**Technology Center 2800**